Design

1. Main program
   a. Sets up the menu
   b. Starts game
   c. At the end asks user to quit or play again
2. Game class
   a. Creates variables for the game
   b. Creates spaces and assigns pointers
   c. Creates player object
   d. Run game
   e. Contains helper functions to help run the game
   f. Controls overall flow of the game
3. Menu class
   a. Gets input from user
   b. Displays menu
   c. Collects user choice
4. Space class
   a. Abstract
   b. Contains member variables common among spaces
   c. Setters and getters for variables
   d. 4 direction pointers
5. Room classes
   a. Sets up the different rooms
   b. Contains events that will return what happened to the game class
   c. Functions for the events
   d. Controls flow for each room
6. Person class
   a. Contains all the information pertinent to the player
   b. Health and mana
   c. Inventory
   d. Setters and getters to set the variables
   e. Position
   f. Increase and decrease health and mana
   g. Functions to manipulate the items in the container
7. Input validation function
   a. Receives all user input
   b. Checks for proper user input

Test Plan

Test Scope	Description	Expected Results	Actual Results
Start and Play again menu inputs	• 5.26 • 652 • 254sde • -1 • -5 48 • 0 • 1 • 2 • $%^	• Not an integer • Not a 1 or 2 • Not an integer • Not positive • Not an integer • Not a 1 or 2 • Play simulation • Quit • Not an integer	• Not an integer • Not a 1 or 2 • Not an integer • Not an integer • Not an integer • Not a 1 or 2 • Play simulation • Quit • Not an integer
All menus created	• Do menus accept proper input. No negative numbers and numbers entered are within range	• Yes, all menus are functioning correctly	• Yes, all menus are functioning correctly
Play again menu	• Will the play again section reset the game and all variables	• Game resets correctly	• Game resets correctly
Rooms and pointers	• Do the rooms and pointers get created correctly	• Travelling back and forth between rooms works as intended. The player character is updating as expected.	• Travelling back and forth between rooms works as intended. The player character is updating as expected.
Room events	• Do all room events take place properly	• Running through each room and selecting all options correctly displays the right menus and story elements. Room events are tested multiple times with different orders of events and all events take place correctly.	• Running through each room and selecting all options correctly displays the right menus and story elements. Room events are tested multiple times with different orders of events and all events take place correctly.
Item management	• Item inventory is properly executed	• Adding items to container executes properly up to the max inventory value. After the user is displayed a menu of all of the items	• Adding items to container executes properly up to the max inventory value. After the user is displayed a menu of all of the items

		requiring the deletion of a non key item. Key items that are required to complete the puzzle are unable to be dropped. When an item is deleted the user has the option to obtain the previous item.	requiring the deletion of a non key item. Key items that are required to complete the puzzle are unable to be dropped. When an item is deleted the user has the option to obtain the previous item.
Player health and mana management	• Is the player's health and mana properly set up and increase and decrease correctly?	• Mana is reduced correctly after each turn and health is properly reduced when mana value is 0. Health is slowly regenerated with a mana value. Potions and specific events correctly handle the stat adjustments.	• Mana is reduced correctly after each turn and health is properly reduced when mana value is 0. Health is slowly regenerated with a mana value. Potions and specific events correctly handle the stat adjustments.
Memory Leak	• Run valgrind	• No memory leaks	• No memory leaks

Reflection

        I started the final by looking at the sample projects that were available on Canvas. After running them, I decided there was one I liked the most. It was by created by the student Christopher Merrill. I enjoyed the way his program was put together and I looked over the code to get familiar with how I wanted to base my project on. I ended up incorporating similar elements from his project and from a couple of the others. I discovered a few tricks that really made the project more user friendly. I enjoyed the reset of the console after steps of the program were completed. I incorporated that into my program. It is nice not having to constantly scroll and having the previous input still on the screen causing distraction. Another trick was the printing of map from a text file. I noticed that was in a few of the projects and implemented that into mine.

        After looking at the code and getting a general idea of how it flows, I began thinking of a theme for my project. I enjoy the fantasy theme and decided that was what I was going to do. I made a rough sketch of the map and some of the important concepts I was going to implement. Also, I came up with rough ideas what each room would accomplish. I wanted to have some sort of fight at the end. Unfortunately, I did not have enough time to finish that and just had the user complete the game by finding a way out of the mansion. I have a few hours to try and add the fight at the end so, I will see if I can finish in time. But if not, I have turned this version in.

        I ran into some issues with trying to get person class and space class to see each other. Googling the complier errors, it seemed to be a problem with my includes. However, several replies on stack exchange said a way to solve is add forward declarations of the classes. So that's what I ended up doing and it worked. Another issue I ran into was the pointers. For some reason one of my rooms was not correctly sending the player into the correct room. Took me awhile to find the problem but it ended up being a typo where the if statement wasn't running properly.

        I really enjoyed this project. It was fun having a lot of freedom. I wished I would have had more time because I had other ideas I wanted to include. What took the longest was getting all the events typed up and properly configured into each room. The player and item management were not much of an issue. I really feel like I'm getting the hang of computer programming and look forward to continuing to learn in future classes.